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**Technology-Rich Learning** Pages 51-55

## Technology-Rich Schools Up Close

*Barbara B. Levin and Lynne Schrum*

**Schools that use technology well have key commonalities, including a project-based curriculum and supportive, distributed leadership.**

How do school districts with long track records of successfully using technology approach technology integration? What can schools that are trying practices like 1:1 laptop programs or flipped classes learn from districts that have long implemented such practices?

We recently studied eight secondary districts throughout the United States that exemplify the creative use of technology in K–12 schools, particularly what leaders in these schools did to make sure technology enhanced learning.<sup>1</sup> For these districts, we found, using technology is not the goal. It never was. These schools achieved their results by focusing on learning-centered goals like making learning relevant, providing new opportunities to close achievement gaps, and improving graduation rates and college readiness. In other words, their goal was to educate students for work and life in the 21st century, not just to add technology.

**Mooreville High School students collaborate on a presentation.**



PHOTO COURTESY OF TANAE SUMP-MCLEAN, MOORESVILLE GRADED SCHOOL DISTRICT

## Commonalities

To accomplish this goal, these sites went beyond adding technology to the mix; most of them simultaneously transformed their curriculum. We found eight commonalities among the schools and districts transformed in this way (see "Eight Keys to Technology Integration" on p. 53); these practices are crucial for successfully integrating technology. We focus on two of those keys here: reliance on project-based learning and distributed school leadership that is 100 percent behind the infusion of technology.

Most of the schools had used project-based learning, or a closely related approach called challenge-based learning, as their preferred pedagogy for several years.<sup>2</sup> The goal of any project-based learning unit is to develop viable, creative solutions to real-world problems or authentic challenges. The solutions developed are presented to communities beyond the classroom and critiqued by audiences beyond the teacher. Ideally, these projects make a difference in schools or local communities.

By interviewing educators and observing at each school, we found that administrators were the driving force behind the technology infusion and that they provided teachers full support. They made sure their school's technology use changed how things were done in classrooms. Each school system we observed—three of which we describe here—promoted 21st century skills, including collaboration, communication, problem solving, critical thinking, creativity, and innovation.

## Going 1:1 in a Small District

During the past five years, Mooresville Graded School District in North Carolina has transformed its instruction to use challenge-based learning as often as possible. Mooresville's superintendent Mark Edwards phased in a 1:1 laptop initiative; every student in grades 3–12 in this small (5,300 students) district now has a laptop to use 24/7. The high school students' standardized test scores have risen, going from 68 percent proficient in 2006–07 to 88.5 percent proficient in 2011–12.

Challenge-based learning permeates the district's middle school and high school—and technology supports the model. We watched 8th grade language arts students at Mooresville Middle School research answers to this challenge question: How can we educate others to be more aware and tolerant of individuals with disabilities? Students used their laptops throughout the three-day investigation into this question and had a high level of engagement. While doing research, students stayed on task, but frequently consulted with one another; the pace of

the class was brisk and purposeful.

**A student works on a robotics challenge with math teacher Steve Harvey at Da Vinci Charter Academy in Davis, California, part of the New Tech Network.**



PHOTO COURTESY OF NEW TECH NETWORK

For instance, students used Google Docs, which enables many students to simultaneously enter text into one document, to brainstorm how they might answer their challenge question. They came up with 60 related questions about individuals with disabilities, such as, How is the education of people with disabilities different? What country is most likely to have children with disabilities? and What percentage of public facilities are accessible? Students then grouped these questions into themes.

In small groups, students brainstormed different ways they could answer all the questions they'd grouped under one particular theme and researched those questions using the Internet. Each student had a specific job within his or her team, and each seemed invested in the work because all were working toward a common goal.

As the 8th graders researched online, their teacher encouraged them to record the information they were gathering as a narration to use with their presentations. Each group created a presentation in Keynote (Apple's version of PowerPoint), which they presented in class. Some groups used iMovie to organize their answers to their questions into compelling slides before they imported these slides into their digital presentation.

In another project, 9th graders researched World War I and created a [multimedia website](#) featuring movies, a podcast, and a web quest to help others learn about the war.

Besides immersing these teenagers in using the Internet for research, these projects called for critical thinking and sustained collaboration. Mooresville teachers told us they liked the way students learn the required curriculum and exercise their critical-thinking skills through taking on projects and using technology. Students asked and answered questions they were invested in. Students told us they like having a chance to be creative in showing what they've learned. One teacher said, "Students work a lot harder now than when it was lecture and notes."

### **How Leadership Helped It Happen**

The Mooreseville leadership team thoughtfully carried out its digital conversion even as the district became more high poverty. Beyond bringing in computers, district leaders encouraged teachers to use challenge-based learning and

provided them professional development to help them learn about this model. Early on, some teachers and technology facilitators attended sessions on challenge-based learning provided by Apple and became trainers for their peers. This training was followed by summer institutes, differentiated professional development on release days throughout the year focused on learning about technology-based tools, and ongoing sharing among teachers in each building, which happens regularly at faculty and grade-level meetings.

The district provided a technology facilitator and a help desk at every school, often staffed by students. Tech facilitators suggested and modeled new tools. Teachers felt supported in trying out fledgling knowledge. Mooresville teachers told us their principals were all supportive, energetic, and visible in classes, encouraging teachers to take risks and try new things.

## **Getting Access When Funds Are Low**

Inver Grove Heights Community School District in Minnesota is a five-school suburban district that doesn't have a computer for each student, or funds to provide one. But the leadership was doing all it could to integrate technology. This district was transforming itself into a technology-rich system one classroom at a time, basing decisions on what worked for each teacher rather than taking a one-size-fits-all approach.

Inver Grove High School used technology-supported challenge-based learning to turn around its alternative learning program for approximately 25 students at risk for dropping out. Before the change, students who weren't succeeding in the regular school structure came to the alternative program whenever they liked, completed worksheets, and then took tests to recover credits. Both the attendance and success rate of students were low. Superintendent Deirdre Wells was determined to try something different. She asked two teachers to create a new program that would include laptops for every student in the alternative setting, a multidisciplinary curriculum, and a flexible, full-day schedule.

When we observed the reconfigured alternative program, we sensed authentic engagement. Previously struggling high school students were using videoconferencing equipment to brainstorm with 4th graders at another school about activities for a joint "Going Green" project. When a high schooler talked about biodegradable products, she had to teach a younger student what that term meant. We saw the pride on her face when her younger partner understood this term. We heard the enthusiasm in everyone's voice as the older and younger students brainstormed ideas for several projects, such as a community recycling fair. The level of communication, collaboration, and engagement we observed wouldn't have been feasible without technology, but teaching through projects was also essential to engaging once disaffected learners.

Inver Grove's Simley High School has also flipped several high school English, social studies, and math classes. Students can work remotely several days a week, viewing lectures recorded by their teachers and doing assignments posted on the school's course management system. This leaves class time for interactive work, labs, discussions, and group projects. Inver Grove calls it the college model. Not all students have their own computer at home, so the district partners with the local library and keeps the school library open early and late to ensure that students have access to computers.

## **How Leadership Helped It Happen**

The superintendent made funds available to teachers who were interested in trying new things with technology. The district purchased iPads for any classroom whose teachers collaboratively proposed an action research project, showing they had a vision for how to use the tools to affect student engagement and achievement. The district also provided technology for a pilot paperless English classroom. The superintendent's goal has been to make sure that any new technology gets directly into students' hands.

We noted that each school leader in Inver Grove creatively used other funds and fund-raisers for purchasing technology. Simley High School's principal organized 5K runs, garage sales, and black-light dances. The schools charged fees to groups that use their buildings and put these fees into their technology fund.

## **A Pioneer in Project-Based Curriculum**

For more than 15 years, New Tech High School in Napa, California, has based its explicitly designed 21st century curriculum on project-based learning. Each of its 400 students has a laptop computer. In the more than 60 other New Tech High Schools across the United States, the curriculum is entirely based on project-based learning; teachers typically collaborate to teach classes of 50 to 60 students in large rooms in which everyone has a personal computing device and students sit at tables to facilitate group work.

We were amazed at the size of the rooms at New Tech High and the many activities going on in each one. The classes looked and sounded like think tanks; students were interacting in teams, clustered around tables. Most had their computer screens open or were looking at a fellow learner's screen. Students carried their laptops around school with them because they used them nearly 24/7 to do research, communicate, write, and analyze data. We noted strategies that New Tech teachers have adopted for managing a highly engaged group of 50 students, such as

using a microphone to get kids' attention.

A 9th grade BioFitness class we sat in on, cotaught by New Tech's biology and health/physical education teacher, combined material from the biology and the health and physical education curriculums. Students learned required content as they collaborated on hands-on projects focused on the systems of the human body and what people need to do to keep their bodies healthy. We observed students very engaged in a lab about DNA, recording data from their results in their laptops.

During this and other projects, students wrote any questions they needed help with on a whiteboard and teachers used those questions to tailor their lessons. Students worked in teams, and teachers worked as consultants. We noticed displays of student work that showed that students were learning about their own physiology.

The biology teacher also taught an elective environmental studies class. Every teacher at the school offered either an elective or a reader's/writer's workshop for struggling students.

## How Leadership Helped It Happen

All New Tech schools are committed to three features: a curriculum based on project-based learning; innovative uses of technology, including a robust learning management system; and a school culture that promotes trust, respect, and responsibility. Given that New Tech High is small, like most of the New Tech schools, its leadership is distributed, with teachers and students having a voice in decisions regarding planning and procedures. Distributed leadership is important to the success of technology-rich schools. We also saw this kind of leadership in the other secondary schools we studied, including larger ones. No one leader can possibly know and do everything that is needed to make such schools successful.

Leaders in the Napa Valley Unified School District have considered the best way to support the technology infrastructure they need in the New Tech schools in the district. For instance, the district figured out that the cost of providing laptops to all new entering students at New Tech High every year was becoming prohibitive. So in building American Canyon High School, the district instead put money into infrastructure—providing wireless access throughout the school—and let students bring and use whatever mobile computer devices they owned—personal computers, Mac laptops, iPods, and so on. The district's move to wireless and cloud computing for storage, with students using their own devices, seems to be working—and may be the future of schools and districts that want to maintain 1:1 computing for students.

## Three Strategies

Our research into tech-rich schools revealed that schools used these three strategies to integrate technology successfully.

*Establish the vision and culture.* The schools we studied have provided ongoing, differentiated professional development for their teachers and have worked to improve their school's culture and climate and transform their curriculum and instruction. They did so nearly simultaneously with implementing 1:1 computing environments. Leaders established a clear vision and mission and figured out how to fund these initiatives.

*Bring technology into assessment.* These schools use technology systematically for ongoing formative assessment. Once assessment data are collected and analyzed, technology is one of the main tools principals and teachers use to differentiate instruction during reteaching and to offer individual remediation and additional practice. Several schools have robust learning management systems in place. At New Tech High School, it isn't just teachers who look at data; students use the learning management system to track their own progress on achieving the school's eight learning goals.

*Establish partnerships.* New Tech's leaders, for instance, partnered with the Napa Valley business community to secure ongoing support for the school's unique curriculum and technology infrastructure. As a result of the Napa district's success with New Tech High, there is now a [New Tech Network](#) that supports schools around the United States that focus on project-based learning and education technology. These schools have a 98 percent graduation rate and a 96 percent college acceptance rate.

Ubiquitous technology is not enough to promote learning. Schools considering integrating technology fully must attend to the eight keys we identified. As these schools did, they should revise their curriculum to focus on 21st century skills embedded in problem-based learning environments. Supportive leaders must ensure that teachers have ongoing, high-quality, differentiated professional development. They must nurture school culture so teachers and students are learning from one another and working toward the same goal—engaging students in solving relevant problems.

## Eight Keys to Technology Integration

Districts with a successful record of integrating technology into instruction do the following:

- Revise the curriculum to promote 21st century knowledge and skills.
- Provide ongoing differentiated professional development.
- Focus on making school culture more collaborative.
- Identify realistic, sustainable funding sources for technology.
- Provide good tech support for teachers.
- Ensure that schools have strong and distributed leadership.
- Have a clear vision for where technology integration is headed.
- Forge partnerships with families, universities, and community businesses.

## Endnotes

<sup>1</sup> For more information about our research and case studies of the districts we studied, see Levin, B. B., & Schrum, L. (2012). *Leading technology-rich schools: Award-winning models for success*. New York: Teachers College Press.

<sup>2</sup> *Challenge-based learning* is a model Apple Computers developed for learning projects. Students design solutions that make a difference for their community while extensively using technology tools.

[Barbara B. Levin](#) is professor of teacher education and higher education at the University of North Carolina at Greensboro. [Lynne Schrum](#) is dean of the College of Education and Human Services at West Virginia University in Morgantown.

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